A brief report on the use of educational technology with autistic pupils

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Abstract

The development of new technologies for autistic children is outpacing the creation of research evidence for their efficacy. As a result, commercially available technologies that are used in practice often have received limited quality research evaluations. If research is to inform the real-world use of technology for user benefit, it must examine which technologies practitioners use, and how they use them. The survey reported here addresses this challenge by aiming to characterise technologies used in autism education. Tablets, computers and smart whiteboards were the most popular devices reported, but newer technological devices such as robots and tangibles were highly used when they were available. Technology was most commonly used to support learning, engagement and communication with autistic pupils. These results suggest that future research into getting the most benefit from current resources would be useful to practitioners, as well as evaluations of emerging newer technologies such as tangibles and robotics.

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Introduction

Digital technology has successfully been used to support and teach autistic children[1] in education settings. Research suggests that technology can support key developmental skills, such as social interaction and communication abilities (Ramdoss et al., 2011, 2012), and also general academic learning such as reading, writing, and research-based studying (Kagohara et al., 2013; Pennington, 2010). However, despite promising research findings about the potential benefits of technology use, parents and professionals have reported some concerns about using technology with autistic children. These concerns include spending too much time on 'screens', decreasing social interaction skills, and increasing problem behaviour (Clark et al., 2015; King et al., 2017).

New technologies, including apps, software and hardware, are rapidly being developed for autistic children at such speed that research evaluation struggles to keep pace. This has resulted in a field with a weak evidence base (Fletcher-Watson, 2014, 2015), where many of the best quality researched technologies are not affordable, or not available to the people they were designed for (Ramdoss et al., 2012). To create evidence-based guidelines for policy and practice on the use of technology in special education, it is important to understand what technologies are available, used, and preferred by the community. The community includes autistic users of technology, as well as those supporting autistic users such as practitioners and teachers. An online survey was used to explore what technologies practitioners use when with autistic children in education settings, and for what purpose(s) these technologies were used.

[1] We will use identity-first language (e.g. autistic person), over person-first language (e.g. person with autism), as preferred by the autistic community (see Kenny et al., 2016).

Methods

Ethical approval was granted from the Moray House School of Education committee at the University of Edinburgh. With advice and feedback from special education professionals (including teachers), a survey was designed asking educators about their experiences using technology with autistic pupils. The survey was distributed via mailing lists, social media, and local services for autistic children.

Results

1.1 *Respondents' occupational demographic*

A total of 136 individuals responded to the survey. Most of the respondents were from the UK (86.36%). Respondents came from a variety of occupations, across mainstream and special education, social care, and intervention services (see Table 1). The mean length of time respondents had been in their current role was 6.22 years (ranging from 6 months to 34 years).

Table 1: Participants' reported occupation

Current occupation/job role	Count	Percent
Teacher	59	38.56%
Practitioner [2]	27	17.64%
Speech & Language Therapist	19	12.41%
Education management (e.g. headteacher)	17	11.11%
Senior practitioner [3]	8	5.22%
Behavioural therapist	6	3.92%

[2] The term 'practitioners' is used in this context to cover job roles working with, supporting, and caring for vulnerable individuals, including infants in nursery, children in school, and children and adults in residential services attached to education settings, and other services (e.g. play schemes).
[3] 'Senior' practitioners refer to those who hold a supervisory of management role to practitioners, and who do not fit under education management. These include positions such as Team Leader or Senior Support Worker

1.2 *Devices used in education settings*

For each listed device, respondents reported whether it was available to students, and if so, whether it was used or not, with the majority of the pupil(s) they worked with (see Table 2). As expected, the most commonly used technologies were tablets, computers and whiteboards, with the least common technologies used featuring recent developments such as robotics, tangibles and wearables. Where these technologies were available, they were often used at high rates, however. Three subgroups of technologies were present: those which were widely available and highly used, those which were sometimes available and highly used, and those which were rarely available but moderately used (see Table 2).

The devices with the lowest usage rate (% of reported use with majority of pupils) were mobile phones and wearables, suggesting that these devices are present, but not used for educational purposes by practitioners. For example, 43% of respondents reported mobile phones and smartphones being available in the classroom, but of these, only 54% were being used for learning purposes. This may reflect such devices being the personal property of autistic pupils, rather than being educational resources owned by the school.

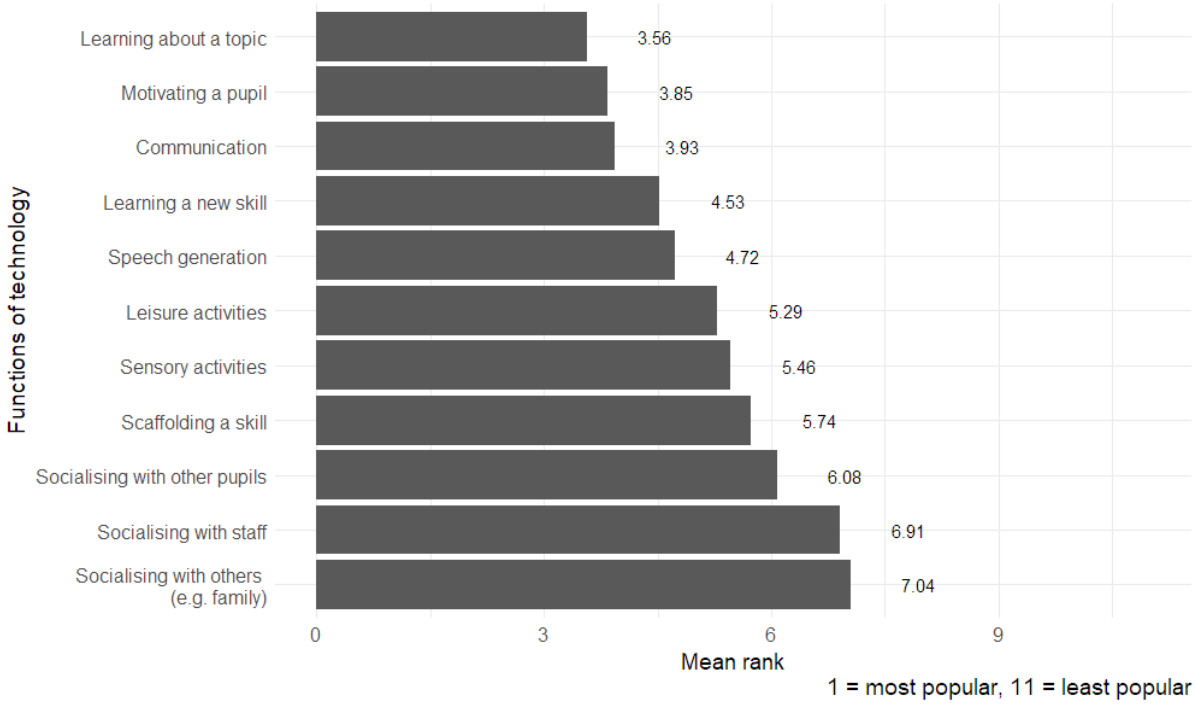
1.3 *The function of technology use in special education*

Respondents reported which functions they most commonly used technology for by ordering items from a list in order from most (rank = 1) to least (rank = 11) used. Items included learning about a topic, communication, and socialising with peers (see Figure 1). The most highly-ranked uses of technology were to learn about a topic, motivate a pupil to engage in class, and communication. The least common uses of technology involved socializing with others, as well as using technology to scaffold teaching and using technology as a sensory activity.

Table 2: Technologies used in the classroom: percentage of respondents reporting availability, and proportions of these in use

Technology (%)	Available	Used	Not used	Unavailable	Usage
Tablet	91	85 (93.4%)	6 (6.6%)	7	Widely
Computer	91	83 (91.2%)	8 (8.8%)	10	available,
Whiteboard	83	77 (92.7%)	6 (7.2%)	15	highly used
YouTube (or other streaming site)	83	76 (91.5%)	7 (8.5%)	13	
Websites (including educational sites such as BBC Bitesize)	80	70 (87.5%)	10 (12.5%)	15	
TV	73	59 (80.8%)	14 (19.2%)	21	
Radio	60	50 (83.3%)	10 (16.6%)	32	
Personal music player (e.g. mp3 player, iPod®)	47	33 (70.2%)	14 (29.8%)	41	Sometimes available, highly used
Table-top technologies (e.g. Smart tables)	24	19 (79.2%)	5 (20.8%)	62	
Tangibles	23	20 (86.9%)	3 (13.1%)	63	
Mobile phone (including smartphones)	43	23 (53.5%)	20 (46.5%)	50	Rarely available,
Robotics	19	12 (63.2%)	7 (36.8%)	68	moderately
Wearables (e.g. Fitbit®)	17	9 (52.9%)	8 (47.1%)	71	used

Figure 1: Mean rank of technology functions



Conclusion

Our survey indicates that devices such as tablets, computers and whiteboards are widely used in autism education, while more recently developed devices such as robotics and tangibles are rarer. However, where these technologies were available, the usage rate was moderately high (i.e. above 50%). It would be useful for future research to evaluate what benefits these new technologies bring to specialist education, and how these new technologies compare to more 'traditional' or widely available technologies (e.g. tablet technologies), and their analogue equivalents.

Using technology to support pupils' social interaction was the least common function of technology reported by practitioners. This may reflect concerns about the impact of technology on social interaction (King et al., 2017) but suggests value in future research examining how current technological resources could be employed to harness social benefits for autistic pupils (Parsons et al., 2017). Indeed, social skills, as well as the opportunity to practise them, are often the priority in supporting autistic children (Kasari and Patterson, 2012).

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